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Insulin Resistance

Insulin resistance is the condition in which normal amounts of insulin are inadequate to produce a normal insulin response from fat, muscle and liver cells. Insulin resistance (IR) in fat cells reduces the effects of insulin and results in elevated hydrolysis of stored triglycerides. Increased mobilization of stored lipids in these cells elevates free fatty acids in the blood plasma. Insulin resistance in muscle cells reduces glucose uptake (and so local storage of glucose as glycogen).

Whereas insulin resistance in liver cells reduces storage of glycogen, making it unavailable for release into the blood when normally only when blood glucose levels are low).

Both cause elevated blood glucose levels. High plasma levels of insulin and glucose due to insulin resistance often lead to metabolic syndrome and type 2 diabetes, including its complications.

Insulin resistance is often found in people with visceral adiposity (i.e., a high degree of fatty tissue underneath the abdominal muscle wall - as distinct from subcutaneous adiposity or fat between the skin and the muscle wall), hypertension, hyperglycemia and dyslipidemia involving elevated triglycerides, small dense low-density lipoprotein (sdLDL) particles, and decreased HDL cholesterol levels.

Insulin resistance is also often associated with a hypercoagulable state (impaired fibrinolysis), blood has tendency to form clots not move smoothly in the arteries, and increased inflammatory substances levels which worsen the Insulin resistance, besides other health impacts.

Symptoms of IR

1. Fatigue.
2. Brain fogginess and inability to focus. Sometimes the fatigue is physical, but often it is mental.
3. Low blood sugar. Mild, brief periods of low blood sugar are normal during the day, especially if meals are not eaten on a regular schedule; they are normally raised by mobilization of glucose into the blood from stored glycogen made from blood glucose previously taken by liver cells. But prolonged hypoglycemia, with some of the symptoms listed here, especially physical and mental fatigue, is not normal. Feeling agitated, jittery, moody, nauseous, or having a headache is common in insulin resistance, commonly with rapid relief once food is eaten.
4. Intestinal bloating. Most intestinal gas is produced from carbohydrates in the diet. Insulin resistance sufferers who eat carbohydrates sometimes suffer from gas.
5. Sleepiness. Many people with insulin resistance get sleepy immediately after eating a meal containing more than 20% or 30% carbohydrates.
6. Weight gain, fat storage, difficulty losing weight. For most people, too much weight is too much fat. The fat in IR is generally stored in and around abdominal organs in both males and females. It is currently suspected that hormonal effects from such fat are a precipitating cause of insulin resistance.
7. Increased blood triglyceride levels.
8. Increased blood pressure. Many people with hypertension are either diabetic or pre-diabetic and have elevated insulin levels due to insulin resistance. One of insulin's effects is on arterial walls throughout the body.
9. Depression. Because of the deranged metabolism resulting from insulin resistance, psychological effects are not uncommon. Depression is said to be the prevalent psychological symptom.

Causes of Insulin resistance.

1. The cause of the vast majority of cases of insulin resistance remains unknown.

2. There is clearly an inherited component, as sharply increased rates of insulin resistance and Type 2 diabetes are found in those with close relatives who have developed Type 2 diabetes.

However, there are some grounds for suspecting that insulin resistance is related to a high-carbohydrate diet.

3. An American study has shown that glucosamine (often prescribed for joint problems) may cause insulin resistance.

4. Insulin resistance has also been linked to PCOS (polycystic ovary syndrome) as either causing it or being caused by it.

5. Other studies have also linked to the increased amounts of fructose (e.g., in HFCS — high fructose corn syrup, currently the least expensive nutritive sweetener available in industrial quantities), its fructose causing changes in blood lipid profiles, among other things.

6. The high amounts of ordinary sucrose (i.e., table sugar) in the typical developed-world diet is also suspected of having some causative effect on the development of insulin resistance (sucrose is 1/2 fructose, which may account for the effect, if any). Insulin resistance has certainly risen in step with the increase in sugar consumption and the substantial commercial usage of HFCS since its introduction to the food trades.

7. Recent research and experimentation has uncovered a non-obesity related connection to insulin resistance and Type 2 diabetes.

   Some substance is produced in the proximal portion of the small intestine which signals body cells to become insulin resistant. If the producing tissue is removed, the signal ceases and body cells revert to normal insulin sensitivity. No such substance has been found as yet, so its existence remains speculation.

Do you have insulin resistance or pre-diabetes?

Anyone 45 years or older should consider getting tested for diabetes. If you are overweight and aged 45 or older, it is strongly recommended that you get tested. You should consider getting tested if you are younger than 45, overweight, and have one or more of the following risk factors:

- family history of diabetes

- low HDL cholesterol and high triglycerides

- high blood pressure

- history of gestational diabetes (diabetes during pregnancy) or gave birth to a baby weighing more than 9 pounds

- Asian (Arab, Persian, Indian, Pakistan), Hispanic American/Latino, or Asian American, or African.

Can you reverse insulin resistance?

Yes. Physical activity and weight loss make the body respond better to insulin. By losing weight and being more physically active, you may avoid developing type 2 diabetes. In fact, a major study has verified the benefits of healthy lifestyle changes and weight loss. In 2001, the National Institutes of Health completed the Diabetes Prevention Program (DPP), a clinical trial designed to find the most effective ways of preventing type 2 diabetes in overweight people with pre-diabetes. The researchers found that lifestyle changes reduced the risk of diabetes by 58 percent. Also, many people with pre-diabetes returned to normal blood glucose levels.

The main goal in treating insulin resistance and pre-diabetes is to help your body relearn to use insulin normally. You can do several things to help reach this goal.

Other similar studies from Finland, China came up with the same conclusion.

Be Active and Eat Well

Physical activity helps your muscle cells use blood glucose because they need it for energy. Exercise makes those cells more sensitive to insulin.

The DPP confirmed that people who follow a low-fat, low-calorie diet and who increase activities such as walking briskly or riding a bike for 30 minutes, five times a week, have a far smaller risk of developing diabetes than people who do not exercise regularly. The DPP also reinforced the importance of a low-calorie, low-fat diet. Following a low-calorie, low-fat diet can provide two benefits. If you are overweight, one benefit is that limiting your calorie and fat intake can help you lose weight. DPP participants who lost weight were far less likely to develop diabetes than others in the study who remained at an unhealthy weight. Increasing your activity and following a low-calorie, low-fat diet can also improve your blood pressure and cholesterol levels and has many other health benefits.

- If you have metabolic syndrome/ Insulin Resistance, your doctor may recommend weight loss with diet and exercise, as well as medication to lower your cholesterol and blood pressure levels.

- Stop Smoking

- In addition to increasing your risk of cancer and cardiovascular disease, smoking contributes to insulin resistance. Quitting smoking is not easy, but it could be the single smartest thing you can do to improve your health. You will reduce your risk for respiratory problems, lung cancer, and diabetes.